

# Aquarium: A Source of Marine Conservation

Palak Jain<sup>1</sup>, Rashmi Dave<sup>2</sup>

<sup>1</sup>Student, Department of Architecture, SDPS Women's College, Indore, India

<sup>2</sup>Associate Professor, Department of Architecture, SDPS Women's College, Indore, India

**Abstract:** The coastal marine ecosystems play an essential role in India's economy by an asset of their natural resources, potential habitats and ample marine biodiversity. Humans extensively depend on marine aquatic resources for food, medicine, and materials as well as for recreational and commercial basis such as fishing and tourism. So the marine ecosystems are degrading at a startling rate. Aquariums and zoos have an exclusive opportunity to take the lead on marine conservation research. Through the process of successfully maintaining an aquarium or zoo, we can conserve marine aquatic species and ascertain conditions which are affecting marine ecology.

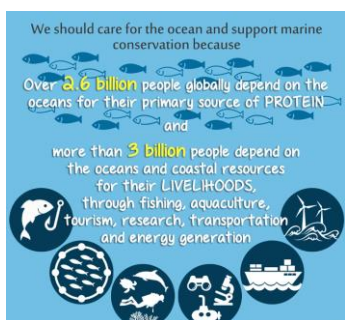
**Keywords:** Marine Ecosystem, Marine Biodiversity, Conservation, Aquarium and Zoo.

## 1. Introduction

Aquariums are used to display marine animals and plants, particularly oceanic or pelagic, fishes and mammals. It also serves as a centre for public entertainment, education, scientific study, conservation and tourism. It is an advanced form of an aquarium, often located on the ocean or a bay or river and features outdoor pools and aquatic environments. This research is about marine conservation and how these implement on aquariums and zoos.

*Conservation education and animal care:*

Aquariums not only about the display of marine life but also about the knowledge we are trying to spread about conservation and animal care. Human activity disturbs the chain of ecosystem and aquariums are created to literate citizens and to raise awareness among them.



*Aquariums and zoos forward marine conservation:*

Aquariums and zoos have an exclusive opportunity to take the lead on marine conservation research. Aquariums and zoos are well arranged for marine conservation and diversity through

public outreach and education. However, there is evidence that zoos and aquariums may enhance the overall conservation attitudes, knowledge, motives, and behaviours of visitors, at least in the short-term suggested that the most adequate way to cultivate conservation behaviour among visitors is to provoke levels of "conservation caring".

## 2. Maintenance of species marine biodiversity

A major need for biodiversity maintenance is the preservation and protection of special or critical, marine habitats containing sea horses, mangrove forest, coral reef, seagrass meadows, shallow water bodies like shallow water

lagoons and beaches. While it is beneficial and efficient analogousness to focus on individual habitat types or species, one must not forget that they exist only as components of wider coastal systems. The complexity of biotic systems and analogousness of their components require that each coastal water ecosystems be managed as a system. The need to conserve the biological systems and the method for doing so were terrestrially derived. Therefore, they required modification to fit coastal habitats. Few oceanic species are on the edge of extinction because of habitat damage. But along the coast and beaches, many species (Turtles) jeopardized by habitat degradation and deficit. Five conditions of marine diversity are paramount for consideration.

1. The diversity of marine fauna is much greater than for terrestrial fauna at higher nomenclature levels.
2. The marine fauna is also much well acknowledging.
3. Most marine species are extensively dispersed.
4. Most marine communities are highly not consistent and variable in species composition.
5. The comeback type to environmental perturbations is relatively small.

## 3. Case study

Marine Aquarium and Regional Centre (MARC) is one of the 16th regional centres of Zoological Survey of India in Digha covered by Ministry of Environment and Forests, Government of India. The centre is settled in 1989. The centre has two distinct sections viz. research centre and aquarium in addition to amenities for mass education to people. The research section of the centre started functioning in 1989; however, the aquarium was opened for public since 2003. It was set up with

the goals of conducting education and awareness programme through the marine aquarium which is an essential part of MARC and providing infrastructure amenity for conducting a professional training course on the coastal and marine ecosystem.



#### 4. Scope

There is less state of art facility available in the country for the appropriate scientific research and awareness and the need for an increase in tourism and aquarium. Marine life is one of the most important and precious resources of the country and there is on-demand for the development and conservation of our marine biodiversity. This art of ornamental fish breeding and trade has a tremendous scope as a cottage industry.

#### 5. Strategies for conservation and management of marine biodiversity of India

The conservation of coral and mangrove habitats has gained great relevance in developing countries in the context of its working role in ecological and socioeconomic sustainable development and the Ministry of Environment and Forest Govt. of India can formulate decisive policies for conservation and the management of coral and mangrove habitats along the Indian coast.

1. Need for rapid expansion in nomenclature to interpret, manage, conserve and use biodiversity sustainability and the need to unify together the existing data from all sources by forming an information network of all agencies in the country.
2. The main concern for the biodiversity conservation to understand what values are substantial, which genes/species/habitat and how much biodiversity should be conserved.
3. Improve the methodologies for different programs, develop more effective policy and target with preferences.
4. The practice of the biodiversity conservation programs with accurate definition and clear goals.
5. Identification of preferences of the communities.
6. Application of anthropogenic objectives of maintaining biodiversity so that it is of possible value to humanity.

The endangered species is quite different from terrestrial ones. e.g., oyster, octopus, porpoises whales, sea fishes, sea turtle, dugong. The occurrence of endangered and vulnerable species is less in the sea because it is an open system with few barriers to migration. While several of the sea mammals and sea

turtles are at risk, the fishes and shellfishes are usually not. The species protection by designating protected and secured natural reserves is comparatively inexpensive and plain to administer. This strategy can be implemented on a site-specific basis, and adequate with available information, staffing or expertise.

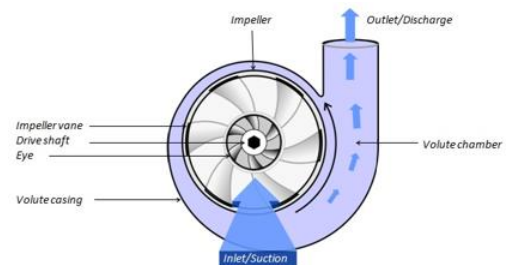
#### 6. Techniques

Techniques used for the construction of aquariums are directly connected to the life of marine animals. Aquaculture is used to create a pleasant environment, where marine animals can survive their life.

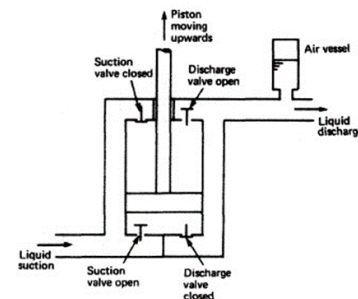
##### A. Aquarium Pumps

The pumps are the “heart” of the whole aquarium system. It is necessary to choose the appropriate type of pump and the right size. One of the criteria for selecting a pump is the servicing amenities and proficiency in the area. As seawater is corrosive, caution has to be taken to choose pumps made of material resistant to oxidation: stainless steel pumps, pumps made of polymers and pumps with rubber parts seem to suit all service conditions. Among many types of pumps used in aquaculture there are two types of pumps in aquaria:

- a) Centrifugal pump: The design of a centrifugal pump is rather simple: there are a fast rotating impeller and a pump chamber in it. The water is flowing into the pipes under the centrifugal force applied by the impeller. The main benefit of this kind of pump is the scarcity of wear under normal aquarium conditions and proper service.



- b) Displacement pump: Displacement pumps function by running water through the pump in distinct quantities using a rotor having the shape of an eccentric cam, or a screw-type rotor or a spirally shaped rotor. In this kind of pump, the rotor is mainly of stainless steel whereas the inner part of the stator is made of rubber.



**B. Piping and Valves**

Among a vast variety of materials, used for aquarium piping the most commonly used are the unplasticized polyvinyl chloride (UPVC) and the acrylonitrile butadiene styrene (ABS). They are both strong, easy to fix, low noxious and non-corrosive materials. However, caution has to be taken to pre-filter the water to prevent fouling. A dual pipeline system can also be convenient in the antifouling “combat”. The same applies to valves, meters, pressure gauges and other fittings along the pipeline. Easy dismantling is significant for replacements and general maintenance. The valves used in the aquarium piping systems are usually ball valves, but also diaphragm, butterfly and needle valves are used.

**C. Tanks**

There are three types of tanks used in aquariums:

a) **The Master Tank:** A master tank (also known as the head tank) is an important component of every aquarium water system as it serves several functions. The master tank being the common distributor of the system is placed higher than the display tanks and the tanks for research to give gravity flow. This technique functions as a transition zone between pump supply and demand, smoothing out any irregularities in water demand.



b) **Display tanks:** The modern idea is to reflect a particular ecosystem in each tank. This ecosystem approaches necessitate tanks with water capacity a few dozen cubic meters or even bigger. In this “aquarium ecosystem,” the wall effect is unacceptable. These tanks are usually constructed in cement or fibreglass. Display tanks should generally contain a minimum substrate such as sand or gravel to allow easy cleaning and disinfection.



c) **Research Tanks:** A requirement in research is flexibility on the size, number and tank arrangement according to the experimental design. These tanks can be made of glass, fiberglass, plywood embedded with epoxy resins, stainless steel or PVC. It is essential that the surfaces will not be toxic and cleaning of the surfaces will be easy. They are common of a rectangular shape as they do not take up too much space and they are easy to handle. If special care should be taken about the fishes, then round tanks are the best solution.



**D. Aquascape**

Aquascaping is the art of arranging aquatic plants, as well as rocks, stones, cavework or driftwood, in a beautifully pleasing manner within an aquarium in effect, gardening under water.



These are some of the important techniques which we use in aquariums to give a convenient life to marine biodiversity.

**7. Key challenges**

Conservation of marine biodiversity in India can be managed in the following ways;

1. Revitalizing the years of tradition of marine biodiversity enumerating to interpret, manage, a censor and sustainably use bioresources.
2. Restoration of lost habitats.
3. Reduction of discords.
4. Marine ecosystem-based fisheries management.
5. Organization of effective policy measures.
6. Economic values of coral reef ecosystem of India in the international market and impact due export revalidated.

**8. Conclusion**

Marine species which are degrading day by day because of

excessive use of resources and many of them are on the edge of extinction. We can overcome challenges through mentioned strategies and techniques. Aquarium and research centre are a great source of marine conservation.

### References

- [1] [https://journal.gnest.org/sites/default/files/Journal%20Papers/369-384\\_702\\_Karydis\\_13-4.pdf](https://journal.gnest.org/sites/default/files/Journal%20Papers/369-384_702_Karydis_13-4.pdf)
- [2] <https://www.frontiersin.org/articles/10.3389/fmars.2016.00174/full>
- [3] <https://en.wikipedia.org/wiki/Aquascaping>
- [4] <https://www.frontiersin.org/journals/marine-science/sections/marine-conservation-and-sustainability>
- [5] <http://zsi.gov.in/App/regcenters.aspx?link=477>
- [6] [https://www.academia.edu/Documents/in/Marine\\_Conservation](https://www.academia.edu/Documents/in/Marine_Conservation)
- [7] Karydis Michael. (2011). Organizing a public aquarium: Objectives, design, operation and missions. A review. Global Nest Journal. 13.
- [8] [https://issuu.com/anandkumars0/docs/report\\_copy1](https://issuu.com/anandkumars0/docs/report_copy1)
- [9] <file:///D:/semester%20work/4th%20year/dissertation/Erbeetal-MPB2016JIPMasking.pdf>